EVALUATE KNOWLEDGE MANAGEMENT TOOLS BY USING FUZZY LINEAR PROGRAMMING TECHNIQUE FOR MULTIATTRIBUTE GROUP DECISION MAKING[*]

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Abstract: The concept of knowledge management is a tried and tested management science that has been implemented by numerous organizations, some with more success than others. The aim of this paper is to develop a framework to aid in the evaluation and selection of KM tools. In this paper, we investigate the fuzzy linear programming technique (FLP) for multiple attribute group decision making (MAGDM) problems with preference information on alternatives. *Copyright © 2006 IFAC*

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1. INTRODUCTION

In analyzing the reasons why organizations want to manage knowledge, investigating only objectives is not enough, as this will only provide a superficial understanding of what drives knowledge management. The activities of knowledge management (KM) should enable the creation, communication, and application of knowledge; and they should drive the capability of creating and adding a greater value to the core business competencies. For years, companies have strived to manage knowledge more effectively, the primary motivation being improved corporate performance (Choi & Lee, 2002). However, despite the growing body of theory, there are relatively few KM texts that make an explicit connection between KM activities and corporate performance (Kalling, 2003). As organizations realizing the importance of KM, many are developing knowledge management systems (KMS) that offer various benefits to facilitate KM

activities. KMS are the IT-based systems developed to support and enhance the organizational processes of knowledge creation, storage/retrieval, transfer, and application (Alavi and Leidner, 2001). As a matter of fact KMS are largely governed around how information flows within and around an organization to provide sophisticated document management rather than actual KM. Despite this, some researchers cite (Malhotra 2002) examples where it was found that there is no direct correlation between information technology investments and knowledge management or business performance. Another research on KM also found that while many organizations have the necessary technological infrastructure in place to support knowledge management its application has not been entirely focused (Parlby, 1997). Furthermore, many of the KMS today seem to provide elaborate document management rather than actual knowledge management. Knowledge focused organizations

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require information systems that maximize knowledge, not just manage data (Mellor, 1997).

To this end, systems of knowledge management have proven to be ''ineffective'' or ''a waste of money''—thereby resulting in failures to meet company objectives and customer demands, challenges to internal and interface integration, extreme cost overruns, and resistance to change. Organizations operate in different business contexts and drivers of KM are often unique. Therefore if organizations do not fully comprehend what drives the need for KM and how to select the necessary technological infrastructure, they may fall into the trap of creating an inefficient knowledge management strategy and operational plans which are often based on experiences of other organizations. In absence of this understanding, KM will just be another cliché concept. Before embarking on a knowledge management journey, organizations therefore has to understand what it is that they would like to achieve with KMS and what value each alternative KM tool will add to the organization with respect to KM. For this particular reason, there is no blueprint for implementing KM in organizations. This suggests that organizations need to focus of a well-defined business strategy in order to establish the appropriate priorities. With this in mind, it is important to consider a number of critical issues when selecting a set of technologies for KM. Therefore, it is valuable to investigate how managers can eliminate vast numbers of tools to support KM. However, no framework currently exists to aid in the evaluation and selection of KM tools and to avoid performance gaps concerning technological infrastructure right in the beginning of the selection phase. KM decision-making problems are often associated with evaluation of alternative KM tools under multiple objectives and multiple criteria. Because organizations operate in different business contexts and drivers of KM are often unique for each company. Most multiattribute decision making problems include both quantitative and qualitative attributes which are using imprecise data and human judgments. We proposed a linear programming technique for multidimensional analysis of preferences under fuzzy environment (fuzzy LINMAP) in evaluating KM tools. (Sirinivasan and Shocker, 1973). Under many conditions, crisp data are inadequate to model real life situations. Fuzzy set theory is well suited to dealing with such decision problems. Finally, the developed model is applied to a real case of assisting decision-makers in a leading logistics company in Turkey to illustrate the use of the proposed method.

2. KNOWLEDGE MANAGEMENT OBJECTIVES

Many knowledge management objectives have been identified in the literature. Havens and Knapp (1999) is of the opinion that knowledge management is aimed at getting people to innovate, to collaborate, and to make good decisions efficiently. Van der Spek and Kingma (2000) state that the main objective of knowledge management is to arrange, orchestrate and organize an environment in which people are invited and facilitated to apply, develop, share, combine and consolidate knowledge. Knowledge management is, in a nutshell, aimed at achieving business value (Gartner Group, 2000). In summary, the basic objective of knowledge management lies in create, share, harvest and leverage knowledge in order to improve work efficiency, i.e. increased organizational capacity through:

- Improved decision making.
- Improved customer service.
- Improved solution of business problems.
- Increased productivity.
- Improved leveraging of corporate and individual knowledge.

3. EVALUATION CRITERIA FOR THE KM TOOLS AND ALTERNATIVES

In order to formulate the multiattribute evaluation model, it is necessary to identify the factors that influence KM practitioners' choice of KM tools. After discussions with four KM consultants and the operations manager, we studied the features of the KM tools provided by vendors, reviewed the literature for selecting software, and identified three essential evaluation criteria to use in selecting the best KM tools: cost, functionality and vendors with sub-criteria and their attributes. The identified criteria were validated by the KM responsible for the firm's KM program.

3.1 Cost

Cost is a common factor influencing the purchaser to choose the software (Davis & Williams, 1994). It is simply the expenditure associated with KMS and includes product, license, training, maintenance and software subscription costs. Technically, these costs can be grouped under two major criteria, namely, capital expenditures and operating expenditures.

3.2. Functionality

Functionality refers to those features that the KM tool performs and, generally, to how well the software can meet the user's needs and requirements. Based on a review of the literature and on consultations with KM practitioners, we identified six key functional elements of a KM tool: document management, collaboration, communication, measurement, workflow management and scalability. Document management, which mainly involves searching for and organizing knowledge, consists of the following six basic features: storage, publishing, subscription, reuse, collaboration and communication (Conway & Sligar, 2002). Collaboration is one of the key aspects of KM, since collaborative problem solving, conversation and